Concentration and Profitability in Non-MSA Banking Markets

by Gary Whalen

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Introduction

Until quite recently, industrial-organization economists, bank regulators, and the Justice Department shared the view that market structure, that is, the number and size distribution of competitors in a market, is the primary determinant of the conduct and performance of banks operating in that market. More particularly, the traditional structuralist view is that the greater the share of the market controlled by the largest competitors or, alternatively, the higher the market concentration, the greater the likelihood that the firms will be able to agree collusively to raise prices above costs and so earn supranormal or monopoly profits.

Concentration and bank profitability have been found to be positively related in a number of empirical studies, and these findings have been interpreted by structuralists as evidence that their position is correct.[1]

The presumption that the structuralist view is valid is reflected in the Justice Department's merger guidelines, which are used by regulators to identify bank acquisitions and mergers likely to have anti-competitive effects. In essence, the guidelines generally proscribe bank regulators from approving acquisitions and mergers that would cause market concentration to rise above an assumed critical collusion-facilitating level.

In the 1980s, however, a number of legal, regulatory, and technological developments and additional theoretical and empirical work have raised questions about the appropriateness of using the structuralist paradigm as a basis for antitrust policy. In particular, the growing importance of potential competitors in an increasingly deregulated environment has been emphasized by critics of the traditional view.[2]

Other critics have suggested that the positive relationship between concentration and profitability found in previous empirical studies may not be attributable to collusion and does not necessarily indicate unidirectional causation running from structure to performance.[3] They suggest that performance determines market structure rather than the reverse. One author has dubbed this the "efficient structure" hypothesis.[4] Superior efficiency, management, or luck cause firms to be profitable and to increase their market share, resulting in market concentration. Market share, a proxy for relative firm efficiency, is thus positively related to profitability. The positive relationship between concentration and profitability is spurious and simply reflects the correlation between market share and concentration.

1 See, for example, Rhoades (1982).

2 For a discussion of these developments and their implications, see McCall and McFadyen (1986). See also the work on contestable market theory in Baumol, et al. (1982) and the discussion of the structuralist view in Brozen (1982).

3 See Demsetz (1974) and Smirlock (1985).

4 Smirlock, op. cit.

This study represents an attempt to provide additional insight on the nature of the relationship between market structure and bank performance. Specifically, the relationship between bank profitability and concentration will be examined using recent data for a sample of 191 institutions drawn from non-metropolitan statistical area (MSA) counties in Ohio and Pennsylvania.

In the following section, some criticisms of the traditional view will be discussed and previous empirical studies will be briefly reviewed. Next, the data and sample design will be discussed. In the fourth section, the data will be analyzed in several ways. Finally, a summary of the results and conclusions will be presented.

I. Problems with the Traditional View

The traditional structuralist view reflects several implicit assumptions that appear to be questionable. The first is that creating and enforcing tacit collusive agreements is relatively easy. For a collusive agreement to be stable, participating firms must institute some mechanism to set and adjust price(s) and allocate market shares. This is not a trivial exercise, particularly for banks, which are multiproduct firms selling complex, heterogeneous products and services in a number of different geographic markets.

The second is that technological conditions, regulation, other barriers to entry, or the threat of predation allow colluding firms in concentrated markets to disregard potential competitors. Concentration-related monopoly power and profits can exist and persist only when entry by potential competitors can be effectively prevented by incumbent firms. In recent work, theorists have demonstrated that when barriers to market entry and exit are low, or a market is contestable, it is possible to have outcomes approximating those of perfect competition even if the number of actual competitors is quite small or concentration is high.[5]

Geographic and product market barriers to competition faced by banks and other financial intermediaries admittedly were formidable prior to the 1980s. Price competition was constrained by interest rate ceilings on deposits and on some types of loans as well. However, this situation has changed dramatically in the past few years. Intrastate and interstate barriers to geographic expansion by commercial banks and by savings and loan institutions (S&Ls) have been removed in a large number of states. Remaining barriers have been circumvented in various ways (with loan production offices and nonbanking holding company subsidiaries, for example). The Monetary Control Act of 1980 and the Garn-St Germain Act of 1982 essentially allow S&Ls to offer all the financial products and services of commercial banks. Largely unregulated nonbank financial companies also now compete aggressively for both loan and deposit customers of banks. In addition, the increasing sophistication and declining cost of computer and telecommunications technology have made it possible for financial institutions to compete effectively in a geographic area without an extensive investment in brick and mortar offices. Financial intermediaries also now are basically free to compete on a price as well as a nonprice basis.

These developments have made it much easier for banks and other types of financial-services providers to compete for customers in any given local loan or deposit market. The implication is that market structure may not be the primary determinant of bank performance in the current environment.

II. Review of Previous Empirical Studies

Comprehensive reviews of structure-performance studies in banking published prior to 1984 have been done by Rhoades (1982) and Gilbert (1984). Although the two authors reviewed many of the same studies, their evaluation of the empirical evidence differs considerably. The former concluded that the results suggest that bank market structure influences both profit and price performance in the manner predicted by the structuralist paradigm. The latter concluded that the results do not consistently support or reject the hypothesis that market concentration influences bank performance. Both concur that where a significant positive concentration impact on prices or profitability was found, the magnitude of the impact was typically slight. Gilbert emphasizes that the positive impact does not necessarily imply that collusion is the cause.

More recent studies of the structure-performance relationship have been done by Burke and Rhoades (1985), Smirlock (1985), Smirlock and Brown (1986), and Whalen (1986). Burke and Rhoades explore the relationship between bank profitability averaged over the 1980-84 interval and the number of bank competitors faced using a national sample of more than 7600 institutions. First, they calculate and compare mean profit rates for sample banks operating in 1-bank, 2-bank, 3-bank and 4-bank non-MSA markets and MSA markets and find results consistent with the traditional structuralist view. The mean profitability of banks in 1-bank markets is significantly greater than the means of the other classifications. Consistent results were found for

5 See Baumol, et al., op. cit

the other non-MSA markets (that is, mean returns in 2-bank markets are above those in markets with a larger number of competitors, and so on). Burke and Rhoades also explore the relationship between their profitability variable and a binary market structure variable (equal to one for MSA banks, equal to zero otherwise) using regression analysis. Additional nonstructural control variables are also employed in the regression. Again, the results are in line with the traditional view. The estimated coefficient on the market structure variable is negative and significant, indicating banks operating in urban markets with large numbers of competitors are less profitable than rural-market banks facing four or fewer competitors.

The authors conclude that the results suggest "...banks in monopolistically or oligopolistically structured markets likely pay lower rates on deposits, charge higher rates on loans and services, or both... [suggesting] that out-of-market and limited-purpose competitors do not provide effective competition to banks in highly concentrated markets. Such markets are apparently not contestable probably because barriers to entry exist in real-world markets."[6]

Although the results were interpreted by the authors as support for the traditional structure-performance view, alternative explanations for the findings exist. In particular, the significant differences in mean returns may be largely due to temporary regional differences in economic activity rather than differences in the number of competing banks faced in local markets. Mean returns were calculated for each sample bank over the 1980-84 interval. Over the first three years of this period, the energy and agricultural sectors were booming. As a result, banks located in agricultural and energy-producing states were highly profitable. Coincidentally, many of these states have restrictive geographic branching laws and so have a relatively large number of local markets with few competing banks. Thus, it is possible that local economic conditions rather than the number of competitors are responsible for the observed differences in mean bank profitability in the sample.

In the regression analysis, the authors attempt to control for other factors thought to impact bank profitability. However, several potentially important variables were not included and may have affected the reported results. In particular, no thrift-presence variable was employed even though S&Ls possessed much the same powers as banks after 1982. Also, a bank-market-share variable was not employed. As noted above, it has been argued by some that the positive relationship between profitability and market concentration found in empirical studies is spurious and will not be evident if differences in market share are taken into account.[7]

Finally, it is not clear that the reported results suggest that potential competition is unimportant. The mean returns used in the t-tests are computed for each market type using all such banks in the sample. That is, banks in each class are pooled regardless of differences in state branching laws. Since differences in bank branching restrictions should have an important impact on the intensity of potential competition, the mean-profitability test results do not provide any insight on the potency of this force. In fact, the regression results do provide support for the hypothesis that potential competition is important. Specifically, the two state branching dummies included in the estimated equation (for unit banking and limited branching states) have positive significant coefficients, indicating that bank profitability is higher in states with branching restrictions.

Smirlock (1985) uses regression analysis to investigate the profitability-concentration relationship using a sample of more than 2,700 banks drawn from unit-banking states in the Tenth Federal Reserve District. The relationship was examined for a single year, 1978. In essence, the study represents an attempt to determine if a positive concentration-profitability relationship remains evident when a bank-market-share variable is also included in the estimated equation. If it does, it suggests that the traditional view is the correct one. If not, and if the market-share variable is significant, it suggests that the "efficient structure" hypothesis is correct. The market structure variable used was the three-bank-concentration ratio. The market-share variable is each bank's share of commercial bank market deposits. Several other additional common control variables are also employed.

Smirlock concludes that the regression results support the efficient structure rather than the traditional concentration-collusion view. Market share is positively and significantly related to profitability even when concentration is included in the estimated equation. However, he finds a significant positive concentration-profitability relationship only when the market-share variable is omitted from the estimated equation. When both are included, the coefficient on the concentration variable becomes insignificant.

16 Burke and Rhoades (1985). p. 11.

17 See the discussion in Smirlock, op. cit., pp. 70-71.

In the later Smirlock and Brown (1986) paper, additional empirical evidence in support of the efficient structure hypothesis is presented. The same sample of banks is used to estimate several variants of a profit function. If the traditional concentration-collusion hypothesis is valid, the expectation is that secondary or fringe firms will act as price-setters. Conversely, if the efficient structure hypothesis is valid, the fringe firms should act as price-takers. Leading firms may act as price-setters under either hypothesis. The profit function can be, and is, used to test whether a firm is a price-setter or price-taker. The estimation results indicate that leading firms exhibit price-setting behavior, while secondary "fringe" firms act as price-takers, regardless of market concentration. Further, there is no evidence that collusion increases with market concentration.

The study by Whalen (1986) represents a simple attempt to examine the relationship between the number of banks competing in a market and bank profitability for a sample of banks drawn from Ohio and Pennsylvania over the 1976-85 interval. The study was designed to provide insight on whether potential competition had become an effective disciplinary force over the past decade. Both states liberalized their bank-branching laws over the period of observation. Further, thrifts are an important force in both states, and possessed essentially all the powers of banks after 1982. Thus, barriers to competition were presumably lower at the end of the period than they were at the outset.

Following the approach of Burke and Rhoades, sample banks were classified according to the number of competing banks faced in the market. Three classes were created for non-MSA banks: 1-3 competing banks, 4-6 competing banks, and 7 or more competing banks. A separate class was created for MSA banks. Mean returns were calculated for the banks in each class for three subperiods: 1976-78, 1979-81, and 1982-85. If the traditional concentration-collusion hypothesis is valid, the mean profitability of banks operating in highly concentrated markets should be significantly higher than for banks operating in markets with larger numbers of actual competitors in each of the three subintervals.

Empirical support for the traditional view was found only in the first time period, before relaxation of either state's bank branching laws and the expansion of S&L asset and liability powers. The findings suggest that the lowering of barriers to actual and potential competition during the last two subintervals largely eliminated any concentration-related impact on bank profitability.

Thus, researchers have found support for the concentration-collusion hypothesis in only one of the four most recent empirical studies of the structure-performance relationship in banking.[8] Further, it is not clear that the results of this one supportive study demonstrate that the higher profitability observed in concentrated markets is due to collusion. A deficiency of all of the studies is that the market presence of thrift institutions is not taken into account.

III. Sample and Methodology

The structure-performance relationship is reexamined in this study, using a sample of 191 non-MSA banks located in Ohio and Pennsylvania. Non-MSA banks are studied because potential competition should be relatively weak in such areas, and so the sample is likely to provide evidence in favor of the concentration-collusion hypothesis—if it is in fact valid.

The relationship is investigated over the 1982-84 interval. This period was chosen for several reasons. Bank branching restrictions in both states were liberalized by early 1982. Further, the 1982 Garn-St Germain Act had given S&Ls essentially the same asset and liability powers as commercial banks. Both of these developments should have intensified potential as well as actual competition in local banking markets in both states. Thus, the sample may indicate if these developments, in conjunction with technological changes in the funds-information transfer area, have rendered rural banking markets contestable.

The particular banks analyzed were selected in the following way. In each state, all single-market banks in continuous operation over the 1976-85 interval headquartered in non-MSA counties were included. Single-market banks are those with all their offices located within their home office county. The presumption is that non-MSA counties approximate rural banking markets. The sample must be restricted to single-market banks so that market structure can be related to profits earned in that market.

The profitability measure employed is annual return on assets (net income after taxes, before securities transactions, divided by average total assets) averaged over the 1982-84 interval.

[8] Two other interesting studies provide evidence that market concentration need not result in anticompetitive bank performance. Hannan (1979) finds a significant relationship between a potential entrant variable and the rate paid on savings deposits in local markets in Pennsylvania. Shaffer (1982) obtains estimates of the elasticity of bank gross revenue with respect to input prices and concludes that the results indicate that the banking markets he studied are neither perfectly competitive nor monopolistic. He finds that the coefficient on a concentration variable in his estimated equation is insignificant and concludes that the competitive forces preventing monopolistic conduct were primarily potential rather than actual or that the concentration measure did not adequately proxy actual competition.

Mean ROA by Market Concentration Level
(Banks only)

Market concentration	Mean ROA	S.D. ROA	T-Stat
HHI < 1800 (N=62)	1.179	0.529	1.89
HHI > 1800 (N=129)	1.015	0.621	
HHI < 2000 (N=71)	1.171	0.512	1.95
HHI > 2000 (N=120)	1.001	0.635	
HHI < 2500 (N=104)	1.116	0.599	1.22
HHI > 2500 (N=87)	1.011	0.591	
HHI < 3000 (N=133)	1.101	0.591	1.15
HHI > 3000 (N=58)	0.992	0.606	
HHI < 3500 (N=155)	1.078	0.602	0.51
HHI > 3500 (N=36)	1.023	0.575	

SOURCE: Author's calculations, based on Reports of Income and Condition, Board of Governors of the Federal Reserve System; and on Summary of Deposit Data, FDIC.

TABLE 1

The deposit data for the sample banks and the non-MSA markets comes from the FDIC Summary of Deposits tape.

The deposit data were used to generate Herfindahl-Hirschman indexes (HHI) of market concentration for the sample banks, both excluding and including S&Ls.[9] Others have used alternative concentration measures for various reasons.[10] The HHI was employed because this is the measure used by the Justice Department and the bank regulatory agencies in implementing antitrust policy in banking.

Mean ROA by Market Concentration Level
(Banks and S&Ls)

Market concentration	Mean ROA	S.D. ROA	T-Stat
HHI < 1800 (N=109)	1.094	0.594	0.70
HHI > 1800 (N=82)	1.033	0.600	
HHI < 2000 (N=129)	1.100	0.598	1.09
HHI > 2000 (N=62)	1.001	0.590	
HHI < 2500 (N=153)	1.087	0.599	0.90
HHI > 2500 (N=38)	0.991	0.585	
HHI < 3000 (N=170)	1.055	0.618	-1.27
HHI > 3000 (N=21)	1.173	0.368	
HHI < 3500 (N=180)	1.061	0.607	-1.08
HHI > 3500 (N=11)	1.190	0.368	

SOURCE: Author's calculations, based on Reports of Income and Condition, Board of Governors of the Federal Reserve System; and on Summary of Deposit Data, FDIC.

TABLE 2

The relationship between concentration and bank profitability is investigated in two ways. First, mean returns are calculated for the sample banks after the sample has been split into two concentration categories—"high" and "low"--that are defined in a variety of ways. If the concentration-collusion hypothesis is correct, the mean return of the high-concentration class should be significantly greater than that of the low-concentration class.

Since this approach does not control for other factors that may impact bank profitability, regression equations similar to those employed by others are also estimated. The definitions of the variables employed in the regressions appear in the appendix. Specifically, the bank profitability variable was regressed on a measure of bank size, a multibank holding company (MBHC) affiliation dummy, a market-size variable, market deposit growth, and the S&L share of total market deposits, in addition to bank market share and market concentration.

The traditional view implies that the estimated coefficient on the market-concentration variable should be positive and significant when other independent variables are included in the equation, including a firm market-share variable.

The bank-size variable is included to determine if larger banks realize scale economies or have diversification opportunities not available to smaller competitors. If size does confer advantages, the sign of the estimated coefficient should be positive.

If MBHC affiliation allows subsidiary banks to realize performance advantages relative to independent competitors, the estimated coefficient of the MBHC dummy should be positive.

The market-size variable is included because rural markets in the sample vary greatly in size. It has been suggested that this variable proxies ease of market entry. If this is the case, the expected sign of the coefficient should be negative.

The market-growth variable is employed to proxy the strength of demand for banking services in each market relative to supply. Rapid market growth suggests robust demand, and so the estimated coefficient on this variable is expected to be positive.

The S&L variable is used to proxy the intensity of nonbank competition in each market. Presumably, the higher the S&L share of market deposits, the greater their competitive impact and the lower the level of bank profitability.

9 The HHI index is the sum of the squared market shares of firms competing in a market. The HHI takes on its maximum value of 10,000 in monopoly markets.

10 The three-firm-concentration ralio is typically employed. Stated reasons for its use are ease of computation and tendency to exhibit the significant positive relationship between concentration and profitability predicted by structuralists.

Regression Results'
Independent variables

Equation	HB	MSB	BSize	Mkt	MG	SLS	MBHC	Constant
(1)	-.000007		-.00073	.00027	-.00006	-.00815	.1207	1.179
	(-0.17)		(-0.53)	(1.65)	(-0.51)	(-2.71)	(0.82)	(7.20)
			$\bar{R}^2$	F				
			.025	1.80				
(2)		.00798	-.00341	.00051	-.00005	-.00791	.1438	1.012
		(1.96)	(-1.81)	(2.75)	(-0.44)	(-2.65)	(0.98)	(7.68)
			$\bar{R}^2$	F				
			.045	2.47				
(3)	-.000122	.01682	-.00548	.00054	-.00004	-.00715	.1732	1.221
	(-2.21)	(2.97)	(-2.63)	(2.93)	(-0.31)	(-2.41)	(1.19)	(7.58)
			$\bar{R}^2$	F				
			.064	2.87				

'The dependent variable in each equation is bank return on assets averaged over the 1982-84 interval.
SOURCE: Author's calculations, based on Reports of Income and Condition, Board of Governors of the Federal Reserve System; and on Summary of Deposit Data, FDIC.

TABLE 3

IV. Results

Mean returns for the sample banks, broken down by concentration class, appear in table 1. The concentration measures in table 1 are calculated using only the commercial banks operating in the market. The first dichotomy, using HHI equal to 1800 as the breakpoint, reflects the Justice Department's definition of a highly concentrated banking market, presumably prone to collusion. The other breakdowns represent an attempt to determine if there is some higher level of market concentration at which supranormal bank profits become evident.

The results do not support the concentration-collusion hypothesis. In particular, for all breakdowns examined, mean profitability is higher for banks in the low-concentration class. T-tests indicate that the observed differences in mean returns are statistically significant for the HHI=1800 and HHI=2000 breakdowns.

The results differ somewhat if S&Ls are considered. These results appear in table 2. Once again, for HHI breakdowns up to 2500, mean returns are higher for the low-concentration class than they are for the more concentrated one. When the HHI breakpoint is 3000, mean returns are higher for banks in the more-concentrated class. However, none of the differences in mean returns are statistically significant. Thus, the results do not support the traditional view.

The regression results are presented in tables 3 and 4.[11] Once again, the concentration-collusion hypothesis is not supported. Instead, the results mirror those of Smirlock and suggest that the efficient structure view is the correct one. Specifically, whether S&Ls are included in the concentration and market-share calculation or not, the concentration variable has a negative, insignificant coefficient when the market-share variable is excluded from the estimated equation. When a market-share variable is also employed, the concentration-variable coefficient remains negative and becomes significant. The estimated coefficient on the market-share variable is consistently positive and significant in equations with and without a concentration variable.

These results are not sensitive to the concentration measure employed. When the three-firm concentration ratio is used, similar results are obtained, both when thrifts are included and excluded.

The reasons for the negative, significant coefficient on the concentration variable in several of the estimated equations are unclear, although a similar result was reported in Smirlock (1985). One possible explanation is that nonprice competition may be more intense in more concentrated markets and so bank profitability is lower. Another is that managers in more concentrated markets can more easily engage in expense-preference behavior and so bank costs in such markets are higher and profitability is lower.[12] Some researchers have suggested that managers in concentrated markets will limit the amount of risks they take (i.e., choose the "quiet life") and so could earn lower returns.[13] Other

11 A formal test was conducted to determine if it was appropriate to pool the Ohio and Pennsylvania banks. The calculated F-statistic was roughly 0.50, which is well below the critical level, and so pooling was deemed acceptable.

12 For a discussion of expense-preference behavior, see Edwards (1977).

13 The possibility that managers might opt for the "quiet life" in concentrated markets is explored in Heggestad (1977).

Regression Results*
Independent variables

Equation	HS	MSS	BSize	Mkt	MG	SLS	MBHC	Constant
(1)	-.000001		-.00078	.00028	-.00006	-.00816	.1205	1.156
	(0.02)		(-0.58)	(1.71)	(-0.52)	(-2.60)	(0.82)	(6.18)
			$\overline{R}^2$	F				
			.025	1.79				
(2)		.00893	-.00288	.00050	-.00005	-.00627	.1423	0.979
		(1.89)	(-1.66)	(2.70)	(-0.42)	(-1.99)	(0.97)	(6.77)
			$\overline{R}^2$	F				
			.043	2.42				
(3)	-.000175	.02063	-.00489	.00052	-.00003	-.00666	.1559	1.234
	(-2.17)	(2.88)	(-2.51)	(2.85)	(-0.26)	(-2.14)	(1.08)	(6.66)
			$\overline{R}^2$	F				
			.062	2.79				

*The dependent variable in each equation is bank return on assets averaged over the 1982-84 interval.
SOURCE: Author's calculations, based on Reports of Income and Condition, Board of Governors of the Federal Reserve System; and on Summary of Deposit Data, FDIC.

TABLE 4

explanations exist.[14] Additional research appears necessary to explain this findingand is beyond the scope of the present paper.

V. Summary and Conclusions

The empirical results obtained using this sample of non-MSA banks do not support the concentration-collusionhypothesis. That is, a strong positive relationship between market concentration and bank profitability was not detected using either type of statistical analysis. Instead, the findings are in line with those reported in Smirlock (1985). That is, bank market share was found to be positively and significantly related to bank profitability both when concentration was included in the estimated regressions and when it was not. In fact, in equations that included both variables, the concentration variable had a negative, significant coefficient, rather than the expected positive one. The fact that the results closely mirror those of Smirlock, despite the much smaller sample size and different time period, with S&Ls excluded and included, lends credence to the view that the efficient structure hypothesis is the correct one.

The results suggest that high market concentration is unlikely to lead to collusion and monopoly profits, at least in states that allow banks some freedom to branch. The implication is that a purely structuralist antitrust policy should be tempered with judgment, particularly in the determination of critical tolerable concentration levels.

[14] See Smirlock (1985), p. 78, footnote 18.

APPENDIX

DEFINITION OF VARIABLES

HB: Herfindahl-Hirschman Index of market concentration, defined using commercial banks only.

HS: Herfindahl-Hirschman Index of market concentration, defined using both commercial banks and S&Ls.

MSB: Bank share of commercial bank deposits in the market.

MSS: Bank share of total bank and thrift deposits in the market.

BSIZE: Bank total deposit size.

MKT: Total bank and thrift deposits in the market.

MG: Percentage change in total market deposits, 1980-84.

SIS: S&L share of bank and thrift market deposits.

MBHC: Dummy variable equal to one if a bank is a member of a multibank holding company, equal to zero otherwise. All variables, unless otherwise noted, are calculated using June 1984 data.

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